NEW JERSEY
DEPARTMENT OF TRANSPORTATION

ANNUAL REPORT
1969—1970
FISCAL YEAR

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DIVISION OF RESEARCH AND EVALUATION

CONTENTS

1. Introduction
3. Bureau of Structures & Materials
13. Bureau of Safety & Traffic
19. Bureau of Electronics & Scientific Aids

Appendix:

27. Organization Chart
29, 30, 31. Table of Personnel
33. Reports & Papers
35, 37. Professional Meetings
39. Publications
41. Committee Memberships

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N48
1969/1970
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DIVISION OF RESEARCH AND EVALUATION

FISCAL YEAR 1969-1970

The following pages of this Annual Report deal primarily with past activities of the Division. Equally important is the future direction which the Division will take.

In order to serve the immediate needs of the Department's operating Divisions in their task to plan, design, construct and maintain the most efficient and safe transportation system, the Division's activities will be directed toward applied research.

It is also desirable to conduct basic research. This will be done as time, personnel and financial resources allow. Our immediate goal will, however, be to serve the immediate needs of the Department's operating Divisions through a pertinent and desirable research effort.

D. W. GWYNN
Director of Research

July 10, 1970

BUREAU OF STRUCTURES & MATERIALS

Project #7701 - Vehicle Entrapment

During the past year we started the development of a configuration of gravel that would act as an arrester, stopping and entrapping out-of-control vehicles within a short distance, with only minimal injury to occupants and damage to vehicles. After an extensive bibliographical search, the efforts were concentrated on preparing full-scale tests of vehicle-impacts with various gravel configurations.

Current plans call for the actual impact-tests to begin in the summer of 1970. The procurement of the necessary monitoring equipment is under way and the construction of the test area is progressing.

Project #7702 - Experimental Pavement on Routes I-80 and I-95

The purpose of this project, launched in 1965, is to evaluate the relative performances of various base-course materials and thicknesses in BC construction and to compare these courses with the base-course used in the AASHO Road Test. Experimental sections were constructed on Route I-80 , Section 5V and Route 95, Section 1R; they are monitored on an annual basis and their performances are noted.

The data are analyzed in annual interim-reports. Special measurements were made in the Spring of 1970, to try and determine the causes of a series of cracks which have been developing

Project #7702 - Continued

in some of the sections.

The ultimate findings should improve the design of flexible pavements in New Jersey.

Project #7713 - Pavement Riding Quality

A roughometer of the Bureau-of-Public-Roads-type is being used for defining the index-of-riding-quality of recently constructed pavements and bridge-decks. The surface-deviations are also being measured with a rolling straight-edge, in order to assist in determining the sources of roughness.

The collection of data is expected to be completed at the end of the present construction season.

Project #7726 - Roadside Vegetation

A cooperative research project was set up with the Agricultural College of Rutgers University, to study new and existing blends of grass. The purpose is to develop mixtures which require less maintenance, yet possess better adaptability and appearance than the grasses used at present by the Department.

Greenhouse experiments are being prepared and locations for roadside test plots are being selected. The completion of this program may require the better part of five years.

Project #7730 - Floating Glass Beads for Traffic Lines

The performance of a new type of glass beads, which have the ability to "float" on a traffic stripe, is being evaluated.

A series of instrument-tests has shown that these beads have generally a higher technical reflectance and a better durability than our present standard beads. A further sequence of experiments, based this time on user observations, will complement the first measurements, so as to determine the practical degree of night visibility produced by the new beads.

Project #7731 - Preformed Elastomeric Bridge-Joint Sealers

Preformed sealers and their utilization in bridge-joints are the object of a two-phase study. Phase I involves research in the construction and instrumentation of two bridges; its task is to determine the relationship between bridge-end movements and ambient-air temperatures, for the refinement of joint-design and construction procedures. Phase II evaluates the sealer material and develops a quality-assurance specification for preformed sealers.

A tentative sealer-specification has been approved by the Department. During the preceding fiscal year, recommendations were also prepared for the design and construction of joint-armor and of the header structure. Much of the work, however, still remains to be done, with additional bridge-instrumentation and laboratory equipment which are in the process of procurement. A paper extracted from this study was presented at the January - 1970 HRB meetings and accepted for publication.

Project #7732 - Anti-Scaling Agents for Concrete

The principal task of this project is to isolate agents which will effectively increase the freeze-thaw resistance of Portland cement concrete.

Approximately 30 anti-scaling materials will be subjected to laboratory freeze-thaw and outdoor exposure-tests and the most effective of these materials will be placed in service on a bridge-deck. The freeze-thaw apparatus is to be delivered this July and preparations for the exposure testings are nearing completion.

In conjunction with this study, a trial application of two anti-scaling techniques was made on two bridges of Route 202. A surface-application of linseed oil as well as a reactive silane concrete-admixture were compared to conventional air-entrained concrete. The results seemed to indicate that neither method offers scaling resistance superior to that of quality air-entrained concrete; but their real significance remained in doubt because--unfortunately--the experiment had lacked the necessary tight, centralized control.

Project #7734 - Composite Pavement on Route 3

The aim of this composite design, constructed near the Hackensack River bridge, was to test the combination of the heavy traffic-carrying capacity of a rigid pavement with the surface-continuity of a flexible pavement. After the issuance of several annual reports, the results still confirm the ex-

Project #7734 - Continued

cellence of its performance. The outcome of this trial installation should prove of major value to the pavement designers of the Department.

Project #7739 - Bridge Construction of Unpainted Steel

A bridge, constructed of unpainted steel in Newark, New Jersey, is monitored every year to assess the steel's performance. Various corrosion-tests are made on specimens mounted in the atmosphere at the bridge site and on a nearby rooftop. Although the experiment has now completed its second year, no significant conclusions can yet be drawn; it shall continue for a total of sixteen (16) years.

But rust-staining of the concrete bridge-abutements has already been found to be a significant esthetic problem. Some protective material has been applied which, it is hoped, will prevent the staining of the abutements and eliminate periodic cleaning by the maintenance forces.

Project #7742 - Pavement Patching Materials and Techniques

In Fiscal Year 68-69 a study began to find materials suitable for rapid permanent patching of concrete pavements--both Portland cement and bituminous--and develop efficient techniques necessary for their placement. The past year's efforts resulted in a state-of-the-art report on the patching techniques used throughout the United States. Our laboratory and

Project #7742 - Continued

field evaluations of new materials and techniques have not yet started, due to the shortage of engineering personnel. These evaluations, however, are planned for Fiscal Year 70-71.

Project #7758 - Bridge Evaluation on Route 3

Surveillance of a structure, which has been designed to undergo and tolerate excessive foundation settlements, continued. Information derived from it readily guided maintenance forces this past winter, in making corrective repairs. The rate of movement of the foundations appears to be steadily decreasing with time; it may soon be possible to reduce the frequency of the monitoring operations.

Project #7771 - Colored Pavement

The evaluation of the colored pavement installed at the intersection of Route 206 and 68 was completed during this fiscal year. The final report concluded that the colored paving material had essentially the same structural serviceability as standard bituminous mixtures, but because of pronounced fading, failed to retain its visual effectiveness.

Project #7772 - Skid-Resistant Roadway Surfaces

The primary purpose of this project is to develop and evaluate skid-resistant surfaces for use on the highway system on New Jersey. In its present phase, the various surfaces that have been developed are tested with the Division's skid-trailer. During the year under review, six materials were placed in a group on the southbound roadway of U. S. Route 1, in Lawrence Township. These materials, and another group placed earlier on the northbound roadway, are monitored monthly to determine the effect of time and traffic on their skid-resistance characteristics. Several surfaces appear quite promising.

As an adjunct to this project all intersections, which had been tested earlier with the Drag Tester in the #7760 Dolomite-Study, were tested again this year with the skid-trailer. These new measurements showed that the basic findings of the #7760 study were still valid, namely that dolomite aggregates, as a class, cannot be considered undesirable; the specific source of the material is a more important indicator.

Project #7779, 7780, 7781, 7782 - Investigation and Evaluation of Pavements, Bridges, Materials, and Equipment

No efforts were spared to give advisory and emergency assistance to other sectors of this Department in matters pertaining to bridges, materials, and equipment. A major portion of these efforts was expended in assisting the Department's Committees on Materials and Equipment in the planning and analysis phases of their evaluation programs.

Among the services rendered were:

(1) Two evaluation reports for the State Highway Engineer on the adequacy of the Addenda-A bituminous concrete specifications.

(2) An interim report on the Maintenance Division's optimization study of the use of chemicals to control ice and snow.

(3) Statistical procedures for use by the Division of Materials in controlling bituminous concrete production and in monitoring-plant acceptance-testing.

(4) Documentation of an Equipment-Committee study of construction and compaction techniques for bituminous stabilized base, already reported, was now presented at the Highway Research Board's meeting of January 1970.

(5) Review of proposed changes to the standard specifications.

Pavement Recommendations

In cooperation with the Bureau of Soils, pavement designs were recommended for 24 design projects. These designs encompassed new alignment and its appurtenances, as well as the means for rehabilitation of deteriorated pavements.

All the pavement recommendations (close to 350 to date), made for 73 state-controlled roads since the beginning of 1957, were indexed (on chronological tables, for each road). This loose-leaf volume of retrospective reviews--in addition to its immediate use as a practical tool--brought out in striking fashion the notable progress gradually accomplished in highway technology in general, as well as in this state in particular, over a period of 13 years.

Future Research

Arrangements are now being made with Rutgers, the State University, to study the behavior of curved-girder bridges. The findings are expected to verify and refine the present design-techniques for this type of structure.

Trials of several experimental finishing-techniques for Portland cement concrete are expected to get under way, within the next fiscal year, on a section of Route 295. It is believed that the evaluation of these techniques will establish the optimal methods for achieving high initial skid-resistance on our rigid pavements.

BUREAU OF SAFETY & TRAFFIC

Project #7704 - Truck Equivalent

This project has been rounded out with an investigation of the influence of trucks at four different geometric designs: signalized intersection, level multi-lane roadway, ramp-entrance and on an upgrade.

The passenger-car equivalent of a truck was found to be less than two for the first three cases noted above, but the indication on the upgrade is that the trucks, because of their slow speeds, have a much greater influence in the traffic stream than that of two passenger cars.

The type of area for which it is the most difficult to determine the influence of trucks is rolling-terrain; it is perhaps the most important area. Individual locations can be expected to yeild results peculiar only to themselves.

Project #7706 - Intersection Design

As a tool for engineers in handling or designing intersections and interchanges, thirty typical designs have been created, chosen among the many intersections found in New Jersey. They comprise signalized intersections, cloverleafs, partial cloverleafs and traffic-circles. In addition to the geometric and control-data, information on traffic movements, accidents, and travel times has been included for each of the thirty examples.

Project #7706 - Continued

Accident-data have been summarized by overall design and also by individual design-element. This was also done for travel-times, by volume for each movement through the various designs. Finally, a method of rating intersections/interchanges has been given.

Project #7711 - Capacity of Signalized Intersections

Various procedures for estimating traffic-capacity at signalized intersections were analyzed and the portions of the procedures, which resulted in consistent or large errors of estimation, were outlined. A method for estimating capacity was devised within the framework of the report, using the physical and traffic characteristics determined in the field.

The next step on this program will be an adjustment of the procedures, by quantifying the parameters used in the various methods of estimation.

Project #7725 - Mobile Television Surveillance

Although our mobile television unit has not been completed as expected, it has already been used to collect data for the Diagrammatic Sign project: traffic was counted on Route 46, comparing the figures with those of the automatic counters, and accident occurrences were recorded at Routes 20 and 46.

After its completion the unit should give us more extensive service for the collection of data on many of our research projects, particularly the evaluation of driver-performance

Project #7725 - Continued

with traffic-control devices and at high-accident locations.

Project #7762 - Sufficiency Rating

This method rates road-sections on the basis of theirr physical condition, their safety features and the service they give to the public.

To this date, three reports have been issued on this subject. The first was a summary of sufficiency ratings set up by other states.

The second one concerned itself with the benefits the public can expect from transportation improvements; it studied various methods of economic analysis to determine the most appropriate one for evaluating those benefits.

The third, completed in this fiscal year, proposed the use of traffic volumes and capacities for estimating the type of service rendered to drivers. It found that the priority of improvements needed by roadway sections, can be derived from the level of service of each section.

Project #7765 - Diagrammatic Signs

At some locations these signs may be an excellent substitute for conventional signing related to interchanges. They combine arrows (in schematic representations of the layout of the exit-ramps and the thru-roadway) with route and destination-guidance.

Project #7765 - Continued

The initial phase of the project covered the northbound I-287 interchange with Route 22. A special procedure was applied that includes the maneuvers of drivers changing between main roadway-lanes and ramp-lanes, in close proximity to the gore of the exit ramp; close observations showed that the use of diagrammatic signs reduced the number of unusual driver-maneuvers, as compared to the number incurred with conventional signing.

Future phases of the study will include the evaluation of driver-action with lane-lines on the diagrammatic signs, and the existing characteristics of drivers during the summer-vacation period with conventional signs.

Project #7769 - Mileposts of Intersections

A printed tabulation and a storage tape were compiled of all intersections on the State highway system. This information is given by route, county, municipality, type of intersection and traffic-control at intersection. Landmarks are also noted for each route.

These data will be used in combination with the accident-storage tapes to obtain tabulations (by roadway) of accident-frequencies to the nearest one-tenth of a mile.

Project #7760 - Exclusive Bus Lane

Proposals for exclusive bus lane on Route I-495 have been reviewed and recommendations formulated for its proposed implementation

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In addition to the aforementioned programs, the Bureau of Safety and Traffic has made preparations for studies of (1) raised, reflective pavement-markers, (2) the evaluation of the two-wire emergency call-system on Route I-287, and (3) a photographic inventory of the entire State highway system.

BUREAU OF ELECTRONICS & SCIENTIFIC AIDS

Project #7703 - Closed Circuit Television for Transportation Research

Because of the vast flexibility of CCTV, this project involves a systematic study to help demonstrate how CCTV systems can be applied to the needs of the Transportation Department. The utilization of CCTV for Transportation research has proven to be beneficial to the highway engineer when the collection and retention of data information is necessary.

A CCTV system has been designed and the equipment has been ordered. For mobility, the system will be housed in a van which will carry its own precision electric generator. Personnel within the Bureau are being trained in the operation of the CCTV equipment. The Bureau has accepted to a large extent, the responsibiilty of maintaining and repairing the CCTV system and other television systems within the Department.

Project #7712 - Fog Studies

Fog research continued this fiscal year in an effort to establish methods for the possible prevention of fog, enabling drivers to proceed safely through fog, and of abating fog. Studies were conducted under artificial and natural fog conditions. The fog chamber at the Mercer County Airport was used throughout the year for various fog experiments. The fog sensors for Route 1 were tested and calibrated in the fog chamber.

To field test the design of the fog broom, the Elizabeth, Route 1, fog broom installation came into being. This installation became operational in September, 1969. Since then, improvements and additions leading to better performance and recording information have been made. Six instances of fog were noted. One of these showed evidence of fog clearing. Data from another fog was lost because of a faulty recorder. The rest disclosed no evidence of fog abatement.

Project #7716 - Two Wire Emergency Call System

This BPR participated project involves the design, development and evaluation of a two-wire emergency call system. Installed beside the road, this system would enable a motorist to quickly indicate to a monitoring station his need for assistance. By pressing a switch located on a delineator post beside the road, the monitoring system at the station will alert an attendant and indicate to him where the stranded motorist is located.

The design of the installation has been completed, and the monitoring equipment is being installed. The laying of the cable along I-287 from Metuchen, Main Street to River Road was completed in June, 1970. The shack for housing the monitoring equipment and personnel has been positioned near the Stelton Road I-287 overpass. Plans are progressing with Phase II which is the evaluation of the acceptance and utilization of the system.

Project #7717 - Audio Signs

This project pertains to the investigation of providing a means of communicating with a motorist by the use of his own car radio. This communication would pertain to highway information, such as, route direction and traffic warnings. The transmitting antenna would be buried along the side of the road, and the effective transmitting range would depend on the number of lanes to be involved.

Experiments were conducted using the original "one mile" experimental cable pair on Route 287 as a buried antenna for AM broadcasting to a moving car. The results were particularly satisfactory at 525Khz. Intelligible reception was effective up to lane width for approximately 2100 feet. This permitted about 30 seconds of radio reception when travelling at turnpike speeds. Tests were also conducted on different antenna configurations and on signal dispersion characteristics.

Project #7722 - Pavement Heating

Specifically designed to study the possibility of utilizing solar heat and ground heat to melt snow and ice on the highway, an experimental pavement installation was constructed at Fernwood. The system became operational on December 19, 1969 and was operated successfully during the winter months of 1969-70. Heat was supplied to the pavement by means of buried pipes which extracted heat from the earth below the experimental pavement.

Project #7722 - Continued

The system is being operated during the warmer months in order to pump heat into the earth for the purpose of storing solar energy. This heat will then be extracted from the earth during the colder months for use in melting the snow and ice.

A report entitled "Pavement Heating" was presented at a Symposium of Snow and Ice Control at Hanover, New Hampshire on April 8, 1970. This report concerned the design, construction and results of this method of snow melting.

Project #7729 - Talking Pavements

This project involves efforts to develop properly spaced corrugations in pavements which will transmit to a driver an audible and intelligible word message as he passes over the corrugation with his vehicle.

Experiments were made on a Route 130 berm strip to determine the nature of sound patterns generated by cars passing over the strip. Also, tests were made using single word loop tapes. The oscillographic patterns and visicorder displays indicated no satisfactory correlations which would permit synthesizing of common vowel sound words.

Research will continue involving the development of synthesizing intelligible sounds from the road surface.

Project #7763 - Miragram Signing

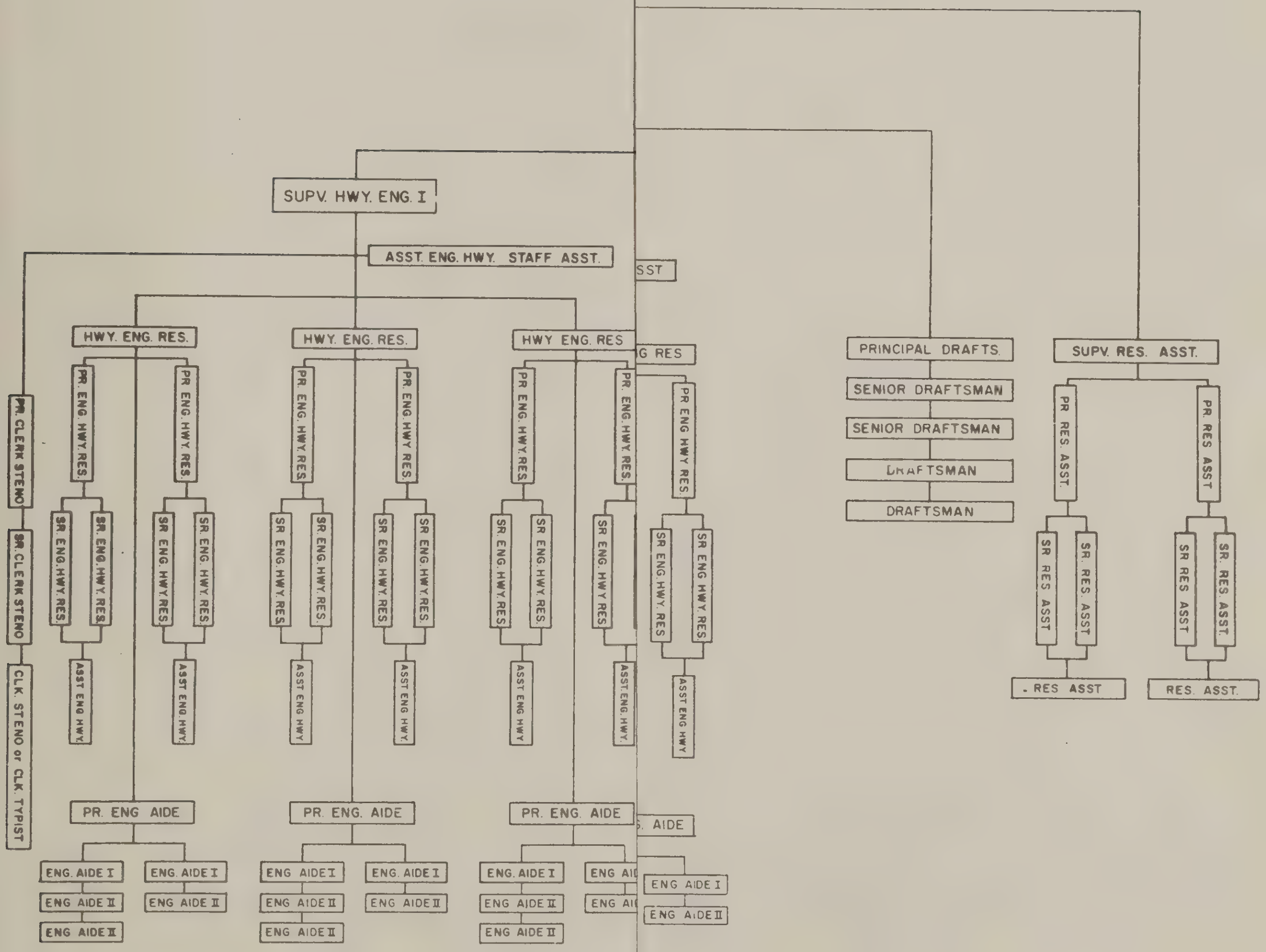
The Miragram project involves the development of highway signs without the need of signposts near the roadway. Using the three-dimensional projection property of real image holography, successful experiments have indicated that holography might be adapted and applied to highway signing. This would help eliminate some traffic sign posts, thus removing potential roadside hazards. In this case, the sign information would be projected to within the drivers normal line-of-sight from a safe distance to the road.

A literature search, personal inquiries, theoretical research and the construction of a successful three foot projected real image have indicated the feasibility of holographic highway signing.

Project #7787 - Noise Measurements

This project involves the investigation of traffic noise with respect to its generation and increase. A work program has been written and the project is being submitted for BPR participation. Some sound level and recording equipment has been ordered.

APPENDIX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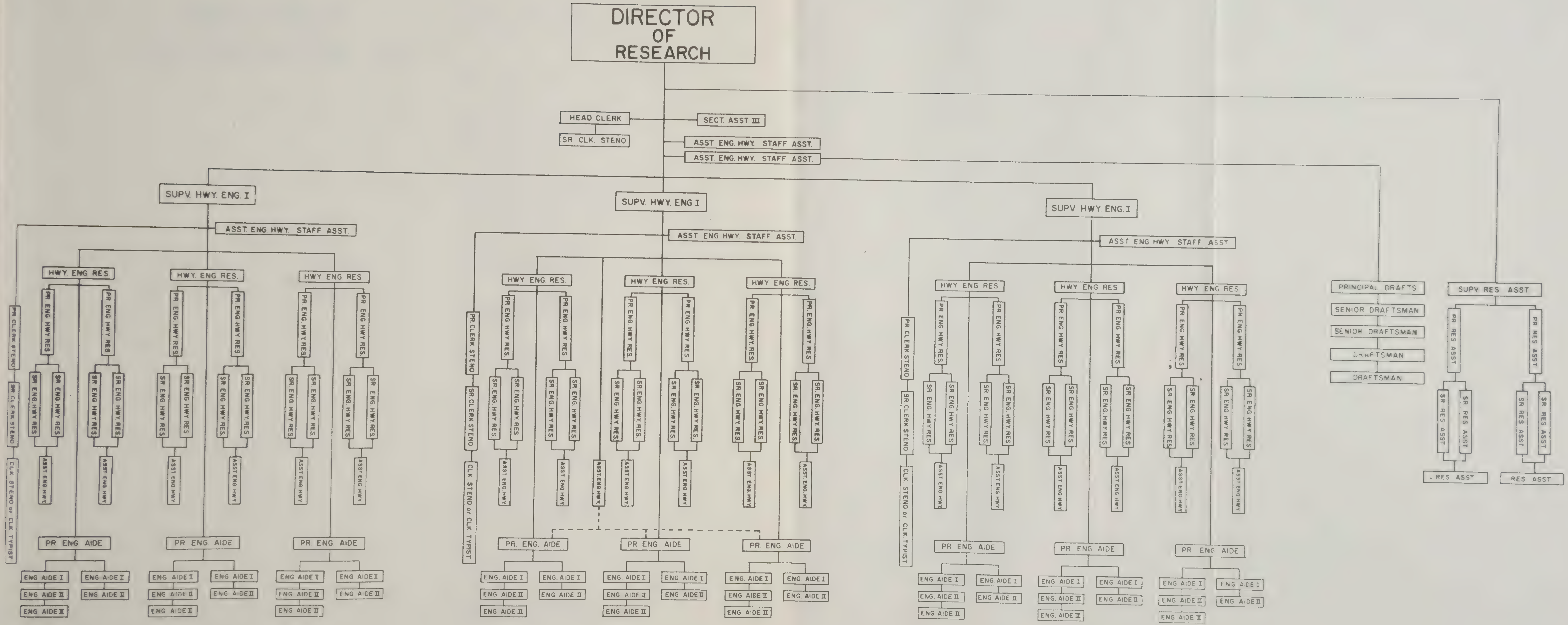
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DIVISION OF RESEARCH & EVALUATION

TABLE OF PERSONNEL

Number of Positions				Title of Position
Proposed	Approved	Filled	Vacant	
1	1	1	0	Director of Research
3	3	3	0	Supervising Highway Engineer I, Research & Evaluation
0	3	0	3	Assistant Supervising Engineer, Research & Evaluation (See Note 1)
9	4	2	2	Highway Engineer, Research (See Note 1)
18	10	10	0	Principal Engineer, Highway Research
36	15	12	3	Senior Engineer, Highway, Research
0	1	1	0	Mechanical Engineer, Trainee (See Note 2)
24	7	6	1	Assistant Engineer, Highway
0	2	2	0	Assistant Engineer, Electrical (See Note 3)
0	1	1	0	Civil Engineer, Trainee (See Note 3)
0	1	1	0	Mechanical Engineer, Trainee (See Note 3)
1	0	0	0	Supervising Research Assistant (See Note 4)
2	0	0	0	Principal Research Assistant (See Note 4)
4	0	0	0	Senior Research Assistant (See Note 4)

(continued overleaf)

DIVISION OF RESEARCH & EVALUATION

TABLE OF PERSONNEL (Continued)

Number of Positions				Title of Position
Proposed	Approved	Filled	Vacant	
2	0	0	0	Research Assistant (See Note 4)
9	2	2	0	Principal Engineering Aide
18	9	9	0	Engineering Aide I
27	14	11	3	Engineering Aide II
1	1	1	0	Principal Draftsman
2	2	2	0	Senior Draftsman
2	2	0	2	Draftsman
1	1	1	0	Head Clerk
1	1	1	0	Secretarial Assistant III
3	3	3	0	Principal Clerk Stenographer
4	4	1	3	Senior Clerk Stenographer
3	3	2	1	Clerk Stenographer
3	2	2	0	Clerk Typist
174	92	74	18	

Note 1: Proposed revised organization eliminates the title of Assistant Supervising Engineer, Research & Evaluation and proposed existing titles be reclassified as Highway Engineer, Research. When this action has been approved the number of approved positions will be changed accordingly.

(continued)

Note 2: This Mechanical Engineer, Trainee, position will be reclassified to Senior Engineer, Highway Research, in September 1970.

Note 3: These positions established by reclassification of an approved Assistant Engineer, Highway, position.

Note 4: Proposed new positions to be filled with non-engineering disciplines to improve capacity for performing transportation research.

DIVISION OF RESEARCH & EVALUATION

REPORTS, PAPERS & PRESENTATIONS

Highway Research in Progress, a geographical study	S&M	8/69
Crim Road Study of Bituminous Stability Base (Paper)	S&M	8/69
Elastomeric Sealers: Temperature and Joint Movements (Paper)	S&M	8/69
Intersection Design	S&T	9/69
Experimental Pavement - Routes I-80 and I-95 (Sixth Interim Report)	S&M	9/69
Chemical Control of Snow and Ice (First Interim Report)	S&M	10/69
Anti-Scaling Experiment on the Bridges of Routes 202-31 Interchange	S&M	11/69
Red-Colored Pavement: Evaluation of the Materials	S&M	11/69
Pavement Patching Techniques	S&M	11/69
Mileposts of Intersections of the State Highway System	S&T	12/69
Capacity of Signalized Intersections (69-023-7711-B)	S&T	12/69
Analysis of 1969 Addenda-A Projects	S&M	1/70
Pavement Heating	E&SA	3/70
Truck Equivalency	S&T	4/70
Analysis of the 1969 Addenda-A Projects (Supplement)	S&M	4/70
Diagrammatic Signing	S&T	5/70
N. J. Center Barrier (Presentation)	S&M	5/70

(continued overleaf)

DIVISION OF RESEARCH & EVALUATION

REPORTS, PAPERS & PRESENTATIONS (Continued)

Composite Pavement, Rte. 3 (Sixth Interim Report)	S&M	6/70
Review of Exclusive Bus Lane Proposals (for I-495)	S&T	6/70

S&M - Structures & Materials
S&T - Safety & Traffic
E&SA - Electronics & Scientific Aids

DIVISION OF RESEARCH & EVALUATION

PROFESSIONAL MEETINGS

		Numbers of staff attending			
		S&M	S&T	E&SA	TOT.
1969					
Sept.	N. J. Asphalt Pavement Association, Annual Luncheon, Montclair, N. J.	2			2
Oct.	N. J. Bituminous Distribution Association Meeting, New Brunswick, N. J.	1			1
Dec.	Winter Meetings ASTM Committee D-4, Sub-Committee 3-E, Cincinnati, Ohio	1			1
1970					
Jan.	HRB: Human Factors Workshop, Washington, D. C.			1	1
	Annual Meeting Highway Research Board, Washington, D. C.	7	7	2	16
March	Rutgers Annual Asphalt Paving Conference, New Brunswick, N. J.	3			3
	Annual N. J. Asphalt Pavement Association Meetings, Absecon, N. J.	4			4
	ITE Meeting on Highway Photo Inventory, Washington, D. C.	1			1
June	Summer Meeting ASTM, Toronto, Canada, Sub-Committee 3-E; Committee D-4; Sub-Committees 2A & 2F; Committee E-17	1			1

D. W. Gwynn's meetings are listed on separate sheet.

D. W. GWYNN

MEETINGS ATTENDED DURING FISCAL YEAR 69/70

1. July 22, 1969, Washington, D. C.
Highway Research Board Meeting, Committee TO-7
"Quality of Traffic Service."

2-6. January 9, 1970, Washington, D. C.
National Technical Council of the
Institute of Traffic Engineers
and
Highway Research Board Committees on:
TO-6 - "Effectiveness of Highway Safety Measures"
TO-7 - "Quality of Traffic Service"
A3F01 - "Highway Capacity"
A3F04 - "Effectiveness of Operational Measures."

7. February 1, 1970, Washington, D. C.
Meeting of NCHRP Advisory Panel B7-8.

8-15. April 21, 1970, New Haven, Connecticut
Institute of Traffic Engineers, District I; and
7 subsequent Meetings of the Institute of Traffic
Engineers -
New York - New Jersey Metropolitan Area.

16. May 11, 1970, Washington, D. C.
NCHRP Meeting on "User Cost and Related Consequences
of Alternative Levels of Highway Service", as Member
of Advisory Panel B7-8.

17. May 17, 1970, Atlanta, Georgia
Department 3, "Section Technical Activities",
of Technical Council of National Institute of
Traffic Engineers.

DIVISION OF RESEARCH AND EVALUATION

PUBLICATIONS

The Highway Research Board published during fiscal year three papers produced by this Division:

- Truck Equivalency, by E.F. Reilly & J. Seifert.
- Atmospheric Corrosion Tests of Unpainted Steels for Use in Construction of Highway Bridges, by B. Cosaboom, G.S. Kozlov and J. Zoccola.
- Preformed Elastomeric Bridge-Joint Sealers: Evaluation of the Material, by G.S. Kozlov.

On the occasion of it's 50th Anniversary, the Highway Research Board will issue, as a special report,

- Highway Research in Progress, a Geographical Study, by Roger Ferval and W.R. Bellis,

which analyzes the 1969 HRB listings of highway research projects in this country and abroad.

DIVISION OF RESEARCH AND EVALUATION

MEMBERSHIPS IN COMMITTEES

HIGHWAY RESEARCH BOARD:

Adhesives, Bonding Agents and Their Uses
Communications
Effectiveness of Highway Safety Measures (TO-6)
Effectiveness of Operational Measures: Technical Activities (A3F04)
Highway Capacity (A3F04)
Highway Safety
Maintenance of Bituminous Pavements
Motorist Information System
Nuclear Principles and Applications
Operational Effects of Geometrics
Quality of Traffic Service (TO-7)
Snow & Ice Control
Surface Properties-Vehicle Interaction

INSTITUTE OF TRAFFIC ENGINEERS:

National Technical Council
the same: Section Technical Activities (Dept. 3)
New York - New Jersey Metropolitan Section
District 1 (NY-NJ M.S. plus New England and Upstate N.Y.)

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS:

Vehicular Communications

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Advisory Panel B7-8 (Field of Transportation Planning, Area of Traffic Planning)
Advisory Panel G (Traffic, Section 5: Illumination & Visibility)

AMERICAN SOCIETY FOR TESTING AND MATERIALS:

Road and Paving Materials (2 Task Groups)
Skid Resistance (Alternate Member)

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